

# DRAGON USER

International edition

75p US\$3.25 January 1985

*The independent Dragon magazine*

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Software Editor  
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Editorial Secretary  
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JERRY IRELAND

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## How to submit articles

The quality of the material we can publish in  
Dragon User each month will, to a very great  
extent, depend on the quality of the  
discoveries that you can make with your  
Dragon. The Dragon computer was launched  
out to the market with a powerful version of  
BASIC, but with very poor documentation.

Articles which are submitted to Dragon  
User for publication should not be more than  
3000 words long. All submissions should be  
typed. Please leave wide margins and a  
double space between each line. Programs  
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a copy. If you want to have your program  
returned you must include a stamped,  
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## Editorial

IF THE 8808 show has any message at all, it is that the Dragon is not dead yet. Rumour of the Dragon market's imminent demise, which have been rife since Dragon Data folded, are somewhat exaggerated.

There was an excitement about the 8808 show not seen since the early ZX Microfairs, when the Central Hall at Westminster was filled with wall-to-wall people. Software and books, admittedly on offer at discount prices, were shifting like there was no tomorrow. But then many Dragon owners are worried that there will be no tomorrow.

Dragon's future has been the subject of considerable debate ever since Dragon Data went into receivership and sold the manufacturing rights to the 32- and 64-bit Spanish company Eurohard. The pundits have been predicting a rapid end to the machine, with software companies refusing to support a declining market.

Certainly the retail chains have emptied their shelves of Dragons and Dragon software as fast as possible. Equally, those software companies specialising in the Dragon have been converting their programs to other machines. Few of them are writing new Dragon programs. Commodore, Sinclair, Acorn and Amstrad are the 'hot' machines now.

Nevertheless, the Dragon has undergone something of a mini-revival in recent weeks. Stores anxious to rid themselves of unwanted machines have found out-price Dragons being snapped up by bargain hunters. Similarly, mail-order software houses have seen a resurgence in business as Dragon owners discover they can no longer buy software in their local stores.

Perhaps the most encouraging news comes from Eurohard's plan to sell an enhanced 64 in the UK. Whatever the size of the existing Dragon User base, the machine will only have a long-term future if it is followed by new models.

# RETURN OF THE RING

TIME REMAINING  
00:00  
REMAINING PAGES  
10000000

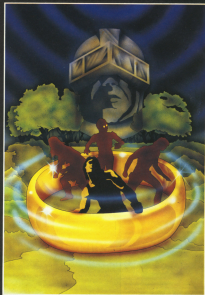
At least that was the impression.

The Guardian of Shedu is defeated, the Hall sponsored forces of the Five Sage lie in ruin. Now Ringworlders, wielders of the Four Bright Rings, must face the greatest challenges to return the Ring OH Darkness to its creators on the hidden planet Ringworld... And somewhere at the ends of time the forces of evil are preparing their response.

After one year of development, Microsoft are proud to present the most sophisticated game ever created for the Dragon 32. Written 100% in machine code, RETURN OF THE BIRD is an outstanding multi program blend of superb high resolution colour graphics and advanced routines that allow you to communicate with your computer in complete sentences. You will have challenge and excitement as you and your Rayworld companions travel a mysterious planet and brave the dangers of an amazing three-dimensional forest moon. An epic adventure controlled by its wealth of detail and diversity.

Many health insurance plans

Please note: RETURN OF THE RING is a complete adventure. You need not buy THE RING OF DAEMONS to play it.



**Abstract**

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# Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, Dragon User, 12-13 Little Newport Street, London WC2N 7PP.

## Missing manual

I PURCHASED a Dragon 32 (secondhand) and the previous owner left the instruction manual. If any reader has a spare manual or doesn't use their manual and would be willing to part with it I'd be grateful if they would get in contact with me.

B. Elder  
4 Langrove  
Dorchester  
Dorset

their home address and the Post Office from which they obtained their postal order, so that I can clear up these orders and send off copies of the game.

Darryl Self  
Operations Manager  
Jaguar Software  
34 Lyndon Street  
Reading RG1 4DD

## Twist or stick

MANY THANKS for your review of Cecil Plays 21. Having taken Brian Cudge's comments very much to heart we have immediately corrected the faults.

As we have sold a number of these tapes we do feel a responsibility to our customers and would like to inform them that anyone who has a copy of Cecil Plays 21 can return it to us as we will, by return of post, send out not only a corrected version but also another one of our games by way of compensation.

Howard Davies  
Jag Software  
PO Box 28  
Maiden  
Surrey GU21 3BN

## Smooth operator

WITH reference to the raster program by Neil Skjelden in the November issue of Dragon User (Open the window) I would like to improve on the program by making the 3-D graphics smoother.

Load the type in the program as listed in November, and then type in the following lines of program:

```
1 POLAR 5:PMODE 4.5:POL5
485 FOR N=1 TO 4:PODFIN=4
TO N:NEXT N
486 PMODE 4.5:POL5
545 PMODE 4.5
725 FOR N=1 TO 4:PODFIN=4
TO N:NEXT N
780 PMODE 4.5:POL5
```

The program will now draw the frame of the cube or triangle on page five then copy it to page one. The effect involves the program off well.

Leslie Reynolds  
Leicester

## In search of Trackers

WE HAVE had a fantastic response from readers to our offer for Back Track using the £1.50 off token published in the October issue of Dragon User. However, we have received some orders that we are unable to send as all we have received is a postal order and the coupon with no name and address.

Any readers who have sent a postal order to incentive and have yet to receive their copy of Back Track please either write to me at the address below, or phone me on 0734-581578 giving details of

## Function key routines

I WAS interested to read Peter Whittaker's article on function key routines in the October issue of Dragon User. I have been experimenting with his method of calling Basic ROM routines, and found that for some routines at least, it does not work. Inspection of the ROM instructions at their entry points shows why: these routines need not the token, but the next character after it is to be loaded into the A register. Also, the CC register is unimportant and does not need to be set with

ANDCC #0FE in the ones I have tried. Below is a listing that calls the ROM routines in sequence. To execute type:  
PMQ004:PCLS:SCREEN1,1:  
CPC101735,95,85.

The technique can also be used with other languages. I use it to call Basic functions from FORTRAN as my MICROFANES has version 1.1 does not have Basic calls, but does allow machine code calls using Z8.

Dr John Nash  
West Kirby  
Merseyside

7930	00100	DNG	38008	
7930 9E 4C	00110	START	LDR	38A8
7932 04 18	00120	PMQ04		
7934 8E 7938	00130	LDR	#1001	
7937 9F 4C	00140	STX	38A8	
7939 A6 84	00150	LDR	X	
793B 8D 45AF	00160	JMP	38A8	
793E 4F	00170	CMA		
793F 8D 45AF	00180	JMP	38A8	
7942 9E 7940	00190	LDR	#1002	
7945 9F 4C	00200	STX	38A8	
7947 A6 84	00210	LDR	X	
7949 8D 45AF	00220	JMP	38A8	
794C 8E 7948	00230	LDR	#1003	
794F 9F 4C	00240	STX	38A8	
7951 A6 84	00250	LDR	X	
7953 8D 45AF	00260	JMP	38A8	
7956 35 15	00270	PULX		
7958 9F 4C	00280	STX	38A8	
795A 39	00290	RTS		
7968	3480 80080 1041	P08	30400	
7960	312C 80010 1042	P08	32105	
796F	3180 80020	P08	32100	
7961	3501 80030 1043	P08	32814	
7963	3235 80040	P08	32216	
7965	3239 80050	P08	32208	
7967	3625 80060	P08	32629	
7969	3239 80070	P08	32204	
796B	3528 80080	P08	32660	
796D	3008 80090	P08	32660	
80680 1014	(P0845)			
START	7960			
10K1	7968			
10K2	7960			
10K3	7961			

## Scramble to the rescue

I HAVE had several inquiries regarding my program Scramble, Scramble published in the October issue of Dragon User. Most problems are caused by incorrect data entries in lines 2970-3130. The program is correct as listed, however, any readers having problems can send me (via Dragon User) a blank tape and a large SAE for a free copy of the program.

Dave Galloway

## Software Top 10

- |        |                          |                 |
|--------|--------------------------|-----------------|
| 1 (1)  | Hunchback                | Ocean           |
| 2 (3)  | Hungry Horace            | Melbourne House |
| 3 (8)  | Dragon Chess             | Chas            |
| 4 (2)  | Mystery of the Java Star | Shards          |
| 5 (7)  | Chuzzlewit Egg           | A & P           |
| 6 (4)  | We Dig                   | Mindquest       |
| 7 (5)  | Outburst in Space        | Mindquest       |
| 8 (6)  | Kingship                 | Bayard          |
| 9 (1)  | Bug Driver               | Maschinen       |
| 10 (1) | Sports Magic             | Knight Software |

Chart compiled by Robotron Software

## Bulletin boards

CAN anybody provide me with details of bulletin boards (either free access or charged access) suitable for use with the Dragon. Also, any person interested in setting up a bulletin board for the Dragon in my area can contact me at 8 Knights Hill, Severn Soaks, Worcestershire.

D J Sutton  
Worcester



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3. fast  
4. efficient  
5. reliable  
6. accurate  
7. precise  
8. correct  
9. valid  
10. sound  
11. logical  
12. reasonable  
13. practical  
14. feasible  
15. possible  
16. probable  
17. plausible  
18. credible  
19. believable  
20. trustworthy



## DRAGON 32 & 64

## DRAGON CHESS

- 1. ready-to-use program in BASIC format
- 2. easy to use
- 3. fast
- 4. efficient
- 5. reliable
- 6. accurate
- 7. precise
- 8. correct
- 9. valid
- 10. sound
- 11. logical
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- 17. plausible
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## 6809 round-up



**JUST OVER 7,000** people attended the 1989 show for Dragon and Tandy Users held recently at the Royal Horticultural Halls in London. Guests formed early on the first day and at one stage it was impossible to move between the Gladys and Microdeal stands as enthusiasts sought to do battle with the latest careers on display.

Most major Dragon companies had a stand, although Touchmaster and Gurnhard SA, the Spanish manufacturer of the Dragon, were notable by their absence. Gurnhard did, however, donate four Dragon SA's as prizes for a raffle.

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The winners of the raffia were: Daniel Soto of London, J J Alexander of Staffs, J H Bellingham of Surrey and J Baker of Devonshire.

Most exhibitors did a thriving trade, with a number of software companies running out of stock on selected titles. John Barnes, managing director of Microdeal said that an extra shipment of its latest release, *Ice Castles*, had to be sent up on Saturday, and this quickly sold out on Sunday. "Everything sold well," said John, "even notebooks and T-shirts."

Microdeal also announced that 10 of its titles will now work on both the Tandy and the Dragon. These include its new releases, *Speed Racer*; *Worlds of Flight*; *Ice Castles*; *Guinness*; *Demon Seed*; and *Chambers*, together with four of Shuch's titles that Microdeal is distributing. They are: *Pill-towners Diary*; *Operation Solitaire*; *Mystery of the Jaws Star*; and *Paradox*.

Computer Marketplace, the show organisers, announced that they hope to have another 680B show in March, either at the University of Manchester or at the Horticultural Hall in London.

## Dragons at Comet

COMET, the high street retail chain, has obtained stocks of Dragon 30s, 40s and 50s bikes from CMC.

The Dragon 32 is being sold for £79.99 and the 64 for £129.99. A single disk drive plus controller is going for £179.99.

As a special offer, Comnet is also selling the Dragon 64 plus disk drive and controller for £199.95.

Shades are available at most major paint stores, and a system exists in Florida whereby a housewife without a shade

As reported last month in *Dragon User*, GEC has now sold its entire stock of Dragon computers and peripherals. The majority of the stock went to Eurohand after Comet had acquired its share. It is not known what quantities Comet has obtained.

## No sign of touch-pad

TOUCHMASTER'S touch-sensitive pad, launched at the PCW show in September, had not been made available for the Dragon at the time of review to press.

Review models for the Compton and spectrum-analyzed several weeks ago, but despite intense efforts to obtain a Dragon version replacement (see *Dragon* report).

George Hynes, Touchmaster's public relations company, at first said that Touchmaster would not be producing a Dragon interface. This statement was later taken back, and both Touchmaster and George Hynes said that a Dragon compatible card is on the way.



**CHAMPION** If Software was selling its Mystical Adventure series. These new titles, *Ultimate* after the *Pearls* and *Beyond the Infinite* are also to be converted to the Dragon, completing the series. Pictured above are Chandra El Merman Parnian (right) and John Williams, with Arthur Hargreaves, who ran the Mystical Adventure series.



**HARRY** [smiles] [a] or **Pearson** [nodding]. The [low] is great company. The winner was Graham Fildes who created a score of 1.8 - he agreed scores by a single letter. Graham was 1.80 at Dragon software. The winners are in competition with Doug Waddington and Edward Goss.



**DOWNCAST**, who are in trouble. The Chapter in this country (see *Ward profile*, page 18) said sexual abuse and complete systems for justice were slightly reduced for 20 years, and Ted (Oprah's partner) said that business was busy. Large numbers of people were in evidence on both sides of the show.



Edi.Abbott@TQM announced that it was the morning, its operations in Chicago. The company was selling its range of 300,000 units of product, which it had been producing since 1998.



CRONIN JONES (third from left) also showing the capabilities of the new 35mm light pen in an advertising campaign.



**PHILIP HOLLAND** Director of Career Medicine with his third grade, Diego, Elena, and Lyla. How often does this



## Premier go under

PREMIER microsystems, manufacturer of DataDisk, the first disk drive system for the Dragon 32, has ceased trading.

All telephone lines to the company have been disconnected and none of the directors could be contacted at the time of going to press. Lack of sales following Dragon data's demise is thought to be the reason for the wind-up.

Cumans, distributors of Pre-

mier's disk system would make no comment as to what had happened, but did disclose that they would be selling off what remaining stock they had. Prices were marked down at the 9999 show.

Ted Coryshead of Compentase said that Compentase will be selling a Flex implementation for Premier's controllers.

No further details are available.

## Hareraiser

HARERAISER FINALE, the computer program which puts you in search of the Jewelled Hare of Misquandade, is now available for the Dragon 32 and 64. Retailing for £9.95, the program, and its precursor Hareraiser Prelude, are essential for treasure hunters in search of the golden hare.

The hare is worth £30,000 and the winner has the option of either keeping the hare or £30,000. The first person to locate the hidden treasure wins the prize.

Each tape is specially



coded and has its own registration number. The winner must produce both tapes, registration number and winning location. Further details from Hareraiser on 01-365 0910.

## Versatile software

FARMERS and pharmacists are now making use of the Dragon with the arrival of versatile programs from two software houses.

Mumps, a high level structured language which is upwards compatible with mini-computers and mainframes is being used by Thoth Data to market a pharmacy labelling package.

The pharmacy labelling and automated stock recording system works on the Dragon 64 using Asist standard mumps. The package provides facilities for printing labels for medicines as well as automatic warning instructions to patients for the drugs dispensed. An optional stock check can be held against each product.

The Dragon contains order codes and wholesale pack sizes for 400 stock lines. Products are accessed by typing the first few letters of their name, abbreviations are then automatically expanded and irrelevant prompts are suppressed if extra information is

given. Online help is available by answering each prompt with a "Y".

Mumps is a block structured language, similar to Logo in structure and modularity, with some commands resembling Basic. It was developed in the late 80ties as a computer operating system and programming language designed to cope with large hospital information systems. Its success in coping with this resulted in it being adopted in the business and commercial field. Further details from Thoth Data at 64 Main Street, Cordy, Leicester LE18 3LU.

From Farmfax comes several agricultural programs covering arable and dairy farming. These is a pig program, an individual milk prediction program, management and ration formulation programs, cash accounts and cash planning programs.

Using aspace for its programs, Farmfax adopted the Dragon 32 after looking at 11 home computers, comparing such things as price, chips and ports.

Further details from the company at Farmfax Sales, Sheep Marsh, Petersfield, Hampshire.

Now £14.95... New Dragon  
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# Dragonsoft

Now software for review should be sent to: Dragon User, 52-53 Little Newport Street, London WC2H 9PP

## Air attack

Program: Fury, Microdeal, 41 Trans Road, St. Asaph, Gwynedd PL25 5JL. Price: £5.95

ALTHOUGH sports are not offered as one of the features on the Dragon, games writers are managing to produce them to good effect in some of the recent games I have seen. Fury is one of these, and they first appear in the title frame.



The theme is aerial combat in a cloud-filled sky, for some reason, somewhere in South America. You control a tiny plane in the centre of the screen that does not change its position, merely turning to face a different direction as you move the joystick around. The background moves in the opposite direction to the plane across the screen and this creates the illusion of movement.

Pressing the fire button produces a stream of bullets that go in the direction in which your plane is pointing. These can be aimed at the nasty enemy gunships that come after you, and this naturally increases your score. There are also several parachutes that float gently across the display.

The effect is visually very good, and would look excellent if the Dragon produced sharp colours, but as it is, it shows up best in black and white. If you can cope with the slowness that comes through staring too long at the fully loaded passing by, you may be awarded another aeroplane as you score the last.

I'm not sure about this game; it looks good but doesn't really get anywhere. On one occasion I hit the plane pointing at the top of the screen and just kept on firing. Whether I was simply lucky I don't know, but anything that came close disappeared with a bang, my points continued to rise, and I almost gave up after two minutes or so out of boredom. Then suddenly a magnetic mine appeared from nowhere and blew up my remaining plane in seconds — so beware! If you fancy your chances against the Red Baron you may enjoy this game, but I found it a little on the lame side.

John Schwen



## Hunchback

Program: The Bells, Blazy Computer Games, 10 Crossways, Lutterworth Road, Blazy, Leicester. Price: £1.99

IT SEEMS that the latest game to get the "Space Invader" treatment is the "Hunchback" type of game. Yet another version, The Bells, has been produced by Blazy Computer Games.

The notable features of this version are that there is both a joystick and keyboard version included on the one tape and that it is VERY fast, so fast that I found it almost unplayable with a joystick, as the

nearest touch went Quadrimode halfway across the screen. All the other usual features of Hunchback are here: animals, ghosts, and so on. There are 14 screens to get through — I didn't get to the end, so I can't say what happens in this version.

Personally, I prefer Gosan's version of "Hunchback".



which is much more playable and has one extra screen. If you really want a "Hunchback" game then take a look at all of these available —

you pays your money . . .  
Brian Cadge



## Evil Orbis

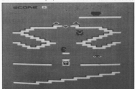
Program: Perilous Pit, Blazy Computer Games, 10 Crossways, House, Lutterworth Road, Blazy, Leicester. Price: £1.99

PERILOUS PIT is an arcade-style game set in the rather original location of a mine. The player has to guide Boris the miner past "The Dreaded Orbis and his Grimes", collect some crystals, and put them in his truck. This is achieved using the joystick to move, and the fire button to jump.

keep the crystals mentioned above.

Strangest of all is the fact that while Boris can run around within a pool of The Inanimate Orbis without the latter bating an eyelid if he has one, jumping up and down right over the other side of the screen sends The Inanimate Orbis into a frenzy.

The graphics are not at all they could be: the movement is very jerky and Boris flickers continually. The sound effects during the game are almost non-existent, and those during the title sequence are only up to basic standard. It should be



Jumping around too much brings to life The Dreaded Orbis, who turns out to be a little too congenial with flashing light, and enjoys nothing more than a quick chase around the crystal mines. Exactly who or what The Inanimate Orbis is, is never explained (it certainly isn't obvious from the graphics) neither is his reason for wanting to

said, however, that this game does sell for £1.99, and I have seen worse games go for £9 or more, but then that is totally inexcusable. A range of cheap software is a very good idea, but only if the quality is maintained.

David Rowntree



## Educational

Program: Matrebox and Spelbox, P.J. Post, The Pirelands, Red Lion Street, Chatham, Bucks HP5 1EZ. Price: £3.75

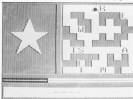
BOTH of these programs have been devised to enable children (university to 10-year-olds, according to the instructions) to test their knowledge of sim-

ple arithmetic and spelling of English words. As such they fit firmly into the "Educational type" of program packages.

The packaging in this case is an ordinary cassette box with a typewritten instruction sheet. The instructions, provided both on the sheet and on the program are clear and easy-to-use; however, if children are to use the programs an adult would probably have to read them first (and then ▶

4 explain how to use them. I found, however, that my seven- to 10-year-olds were able to work out how to use the programs even without the instruction sheet. Now to the programs themselves.

**Spelling** is the simpler of the two programs. The screen display appears to be designed to represent a television set production line with a supply of suitably animated working parts. To the accompaniment of suitable noises a piece is lowered on to the "line" on to which either a word or an arithmetic expression is written. The player has a limited length of time to express the view whether the said display is correct or not by depressing the "W" or "E" keys for an incorrect spelling or turn while the "R" or "C" key needs to be pressed if they are considered to be correct.



If a set of five questions are answered correctly then the game will proceed to the next level of difficulty. There are six levels in all and it is possible to start a game at any of the levels. This works quite well for the arithmetic problems but falls down on the spelling one in that I found that my children were finding difficulty in deciding what word they were attempting to spell in some cases, as they only had an incorrect rendering of the word as a guide to what it was. There were no pictures to help. However, if a word was incorrectly spelt and the player assumed that it was correct, the correct spelling was given.

In the spelling test version of *Maximise* the player is given a simple picture together with a maze which contains a number of mobile letters which are "latched" by a little man who is himself

moved around the maze by means of the cursor keys. When he reaches the desired letter the player must press the spacebar and the letter is entered in the first blank available on the bottom line of the screen. The correct number of blanks are given to spell the required word. More letters are provided than are required to spell the word.

Similarly in the arithmetic version of the program, the player is given a specific task to perform given a number of digits and operators which are to be found in the maze. They are assembled to give the required expression in the same way as the spelling program. In both cases the player is corrected upon giving the incorrect answer.

This is quite a good program in that the graphics and sound are attractive and my children enjoyed playing with it

but it falls down in that it does not give the child any indication of how well, or how badly, he or she is doing in other words it does not keep a score. This is a great pity as it spoils an otherwise good program.

Both of these programs have been written in Basic, and it is a tribute to *Dragon Basic* that such graphics can be written using this version of the language. Full use has been made of the colour in *MAXIMIZE* and sound facilities.

There is little doubt that any child (or even a few adults) could benefit from these programs in order to improve their spelling in particular.

However, sooner or later the child is going to learn all the problems set in the program and there will be no more of a challenge. An educational program of this type these days does need the facility to

be able to enter a new set of words to be used. These could either be entered by the teacher or parent, or as a

separate data file.

John Jayne



## Mathematical

**Program:** Teach Me, AC Software, 434 Corn Exchange Building, Haringey, Dutch, Manchester M4 3EY. Price: £3.45.

**THIS TAPR**, aimed at junior school children aged seven to 11, deals with everyday mathematics — the four rules of numbers.

Children are asked to choose between addition, subtraction, multiplication and division, and hard and easy options exist within each set. They get three chances to

do so. Any program purporting to "teach" should at least leave the user with some extra skill or knowledge. This does neither.

Translate this sort of program into the adult world. Imagine buying a program which says it will teach you Russian. It flashes a word on the screen and you have to translate it. If you get it wrong three times it gives the translation and then goes on to another word.

After a hundred or so times it might repeat itself but I doubt if you will remember that fleeting glance at the Russian and English equivalents — and



make the right decision and are told "too high" or "too low" after a mistake.

Each response is timed to one-hundredth of a second and this information is printed on the screen when the child answers the question correctly. After 10 questions they are graded from "You must try harder" onwards.

Now what trying harder has to do with hitting the right answer to a series of random questions, I don't know. Presumably it pupils know how to take 271 from 509 they would do it. But one thing is for sure — if they couldn't when they started the test they could use "Teach Me" for 100 years and get no nearer to being able to

How long would it take for you to be able to converse with the "man in the street in Russian? More than a life-time I suspect. Now for adults this would be laughed out of court but we put this sort of thing in front of children and expect them to learn from it.

The program is only geared up for some appalling spelling and grammatical errors.

What is 774 divided by 9?

or how about:

Go on have another five minutes!

Now on earth software companies can put out this sort of thing is quite beyond me.

Mike Hamblin



## Graphical data

**Program:** Instant Graph Plotter, R & P International Computer Services, PO Box 129, Wembley, Middlesex HA9 3UG. Price: £7.50.

**THE display of data in graphical form — and I use the term in its strictly mathematical, rather than computer,**

sense — is the most common form of presenting data visually. Instant Graph Plotter is a program that does just that, but it is much more than its title suggests.

Once the basic data is entered, guided by on-screen prompts, the graph is drawn on its own, or in conjunction with other graphs held by the com-



puter. Space doesn't permit mentioning the many control functions in full, but some of the main features are: addition, deletion or change of individual points, superposition of grids, axis markers and lines and calculation of the area under the curve.

The graph can be instantaneously redrawn in logarithmic form, or with data converted to a power, root, reciprocal, or other multiplication factor.

If all this seems a little daunting, the package is amply supported by a 27-page manual, and half an hour spent with this, and using the

excellent on-screen prompts, will make its use simplicity itself. Apart from its educational value, Instant Graph Plotter is useful in displaying graphic data, and would be handy for sales conferences, science fairs and exhibitions.

Written in Basic, it is readily accessible for modification, although as it stands, there is little memory left to spare on a 32K machine. Users with particular problems are invited to contact the suppliers, R & P International, for help.

(London Lee



## Machine code

**Program:** Programmers Utilities, Microtel, 41 Truro Road, St. Austell, Cornwall. Price: £3.90

This cassette contains nine short programs that each make up a lesson about machine-code programming in general and using the 6800C in particular. Some lessons are terminated with a short question and answer section sometimes using multi-choice answers.

The first lesson introduces the ideas behind machine code programming and how the different registers in the

illustrate particular points and to demonstrate the advantages over Basic.

Subsequent tutorials go through addressing modes, branching and the whole instruction set, and later sessions touch upon pointers and short machine-code routines used to speed up video displays in your own programs. The style is rather compact but friendly, and is not beyond the comprehension of an able secondary school pupil.

Although I feel there could have been more question and answer sessions, and that the computer is frequently used merely as an electronic black-

## Utilities

**Program:** Tape Doctor, Computel, 22 Grove Park, Burgess Hill, Sussex BN24 3BU. Price: £4.95

This is a utility program which has been written to enable the Dragon User to obtain more information about what has been recorded on tape by the Dragon and also to be able to salvage programs of tapes that have been damaged in some way.



How many times have you tried to load a program only to find that the header block has been corrupted in some way? Well this cassette contains the answer to your problems. It also enables the merging of different Basic programs, a facility which is sadly missing on the basic Dragon.

The copy which I received gave quite a few problems with loading. This is very un-

The cassette, packed in an ordinary cassette box, comes with an 18-page manual on how to use the program. This is well written and I followed it with difficulty should be experienced in learning how to use this facility. Some useful information is given on how the Dragon stores files on tape. Also on the tape is a Basic program which generates shipping lists, supplied in ordinary form, ASCII form and in a couple of damaged versions so that program repair can be practised. Following these there are three short Basic programs for learning how to merge or append programs.

If you have a printer the "Doctor" also enables you to dump the contents of files (in blocks of hexadecimal numbers) on to paper as well as printing out catalogues of cassette contents, with useful details such as the length of a file and memory locations associated with Machine Code files. It also identifies whether files are Basic, ASCII, machine code or DATA types. This is formatted to fit on 80mm wide self-adhesive labels, just the job for sticking on to cassette boxes. This information can also be obtained without a printer of course.

Once loaded normal Basic programs can be loaded into the computer and the "Doc-

### 1. DRAGON MONITOR — CLOAD "DRAGONMON" and RUN

This utility is a great aid to finding out debugging machine language programs. The commands are:

- 01 — Display address of memory
- 02 — Memory memory
- 03 — Set memory
- 04 — Load memory
- 05 — Go to location
- 06 — Fix location
- 07 — Execute program
- 08 — Display Memory Register

Full instructions are included within this program.

### 2. BEEP TEST — CLOAD "BEEPTEST" and EXEC

This utility will determine if all seven bits of ROM are working. If the ROM is OK, the message "ROM OK" will appear. If a fault is found, no address will be displayed.

### 3. SEARCH PROMPT — CLOAD "PROMPT" and EXEC

This utility is used to search for a particular address in memory. It will search for a particular address in memory.

### 4. TAPE MONITOR — CLOAD "TAPEMON" and RUN

This is a utility to monitor your tape for a quick reference. Full instructions are included within this program.

### 5. BASIC ANALYSIS UTILITY — CLOAD "TUTBASIC" and EXEC

6800C processor operates. The second session talks about different number systems and why hexadecimal and binary are used in computers rather than base 10. Many of the sessions use examples of machine code programming to

board, this cassette does go some way to demystifying the world of machine language and that can't in itself be a bad thing.

(John Soutter



NAME	TYPE	BLOCKS	EXEC	LOAD
DOCTOR	MYCODE	97	7338	7538
SHOPPING	BASIC	26	OK	
SHOPPING	BASIC	12	OK	
EXAMPLE	DATA	21	OK	
BAD CHECKSUM				
DOCTOR	MYCODE	28	HALT	
DOCTOR	MYCODE	21	HALT	

usual with the recorder I have and therefore I feel inclined to believe that the quality of the recording leaves something to be desired. However, by using the "Doctor" program I was able to find out where the program was stored in memory and was then able to CLOAD a copy of it on to another cassette. Ever since I have done this I have had no trouble at all with the program.

for" called upon at any time simply by entering EXEC.

All in all, this is a very good package and I give it a top rating for anyone who does a lot of programming, and could well need all its facilities. My only note is that the manual is written in American and not in English.

(John Soutter





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Discount software is now available through the medium of the Dragon User club — this month save £1.50 on each of these games and adventures from Computer Rentals

THE Dragon User Discount Club is designed to save you money. This month's special offer, which is only open to readers of this magazine, features six software titles for the Dragon 32 from Computer Rentals. Each game has been reduced to £5.45, down from £6.95. To order your game(s) simply cut out the coupon on this page and send it, together with a cheque or postal order, to: Dragon User Discount Club, 12-13 Little Newport Street, London WC2R 7PP.

giant slalom runs, negotiating a series of stone gates and avoiding the trees. The program is a 3D perspective simulation with five runs.



### Keys of Rath

An adventurer in search of the keys, you must use your powers of deduction and determination to overcome the mysteries of the caverns. Orcs, trolls and the giant Jab-jarro are out to stop you in your quest.



### Handicap Golf

Bogey, birdie, an albatross or par are all possible on this one- or two-player 18-hole handicap game. There are bunkers, lakes, trees, gorse bushes, the rough and putting

greens to be taken into account.

### Laser Racer

Designed by Martin Software for Computer Rentals, Laser Racer puts you inside a huge computer. As the driver of a space-age laser racer, it is up to you to reach the computer's central processor and destroy it. Joystick or keyboard control.



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# Blowing on an EPROM

Kath and Steven Brain review an EPROM programmer

IN THE September 1984 issue of Dragon User we reviewed the impressive PDS232 I/O port interface from Steve's Electronics Supply Company, and in this issue we return to take a look at a new EPROM programmer from the same source.

EPROMs differ from RAM in that they are non-volatile (retain their information when the power is removed), and a blank (empty) EPROM has all of its bits set to logical "1". A new EPROM is initially in this state, and a "used" EPROM can be returned to its original condition by suitable treatment with ultra-violet light in a special erasing unit. The actual programming ("blowing") of an EPROM involves selectively setting appropriate bits in the device to logic "0" to code for the required machine code routines, by applying a suitable voltage.

## One-time device

The essential difference between a ROM and an EPROM is that the former is a "one-time" device whose contents can never be changed. In addition, preparing the "mask" for a ROM is a costly procedure, and they are therefore only really useful for long runs of unchanging routines. In fact a quick glance many home micro's reveals that the "ROM" is really an EPROM.

At first sight the programming unit looks familiar as it uses essentially the same custom ABS cartridge as the PDS232 and I/O port, with its supporting legs and secure connection to the Dragon cartridge slot. Portable differences, however, are a 2P (two insertion force) socket on the top to hold the EPROM safely and securely, and a pair of LEDs (green for power-on, and red for programming voltage indication) on the front.

Lifting the lid reveals a densely packed circuit board (once again bearing the logo of Pace Electronics). The programmer tested was a "production" unit (priced at

£79.00), but a kit version (£59.95) is also available for the electronics enthusiast, and the PCB (£11.95), control EPROM (£70.00) and case (£3.95) are also sold separately.

A fair degree of skill in welding a soldering iron is essential in construction of the kit, and a number of the most useful features of the unit, including overvoltage protection and Intelligent Programming are omitted from the specification of the kit version. Unless you are a really dedicated "do-it-yourself" enthusiast (or on the bread-line!) then the ready-built version is the one recommended.

The power supply is taken directly from the Dragon bus, so that no extra rail connections are needed, but at present the

unit is only recommended for the Dragon 32 as the extra power consumption could possibly overload the handle-wired supply on the 84. A DC-DC converter switching at about 20 KHz is used to provide the set-out voltage levels required for different devices (which range from 3.5 to 25 V) and the resonance of the ferrite core produces a variable muted whistle as it works. Accompanying the unit is a comprehensive 11 page "user guide" which describes the operation in clear detail.

An important feature of this programming unit is its "user-friendly" face which uses a menu driven software structure (figure 1) to ensure that even the novice programmer can operate the unit without difficulties, and constant recourse to the manual. On boot up the memory map is rearranged (figure 2) with a 16K block of RAM (formed the "map") set aside to provide an "image" of the EPROM contents. When an EPROM is programmed it always uses the current "map" contents as the data source.

## Automatic configuration

Up to 12 different types of single rail EPROM are supported (figure 3), with the unit being automatically configured for the current EPROM type by simple software selection via the keyboard, with the SET DEVICE TYPE option (rather than the usual system of having to set up a complicated series of DIP switches).

Intel 2708	Texas 2808
2716	2816
2732	2832
2764A	
2784	
27164	
27128	
27128A	
27256	27A option

Figure 3: EPROM types supported by ready-built unit

The 28 pin DIP socket is used for both 28 pin and 26 pin devices, and the ready-built unit is effectively "bomb-proof" against incorrect insertion of an EPROM. First of all the socket is normally in a "shut-down" condition, so that an EPROM cannot be inserted into an active socket, and secondly the unit automatically monitors the supply rails for error conditions, which cause automatic shut-down and display of appropriate error messages (figure 4).

The designers have also considered the possibility of a hardware fault occurring, making it impossible to turn off the Vpp supply, when a screen prompt warns you not to insert any more valuable EPROMs. The only potential disaster remaining is incorrect selection of the standard 2704 or 27128 device instead of the equivalent 2764A or 27128A chips (which use a lower programming voltage), so reading the small print on this particular type of chip before programming is essential.

The target EPROM type can be changed at any time so that it is possible to combine the contents of more than one

- 0: VERIFY
- 1: LOAD FROM EPROM
- 2: PROGRAM EPROM
- 3: EMPTY CHECK
- 4: EXAMINE CHANGES
- 5: CLEAR DATA
- 6: COMPLEMENT/FILL DATA
- 7: LIST
- 8: SET ADDRESS LIMITS
- 9: LOAD FROM MEMORY
- 10: SET DEVICE TYPE
- 11: MOVE MEMORY BLOCK
- 12: QUIT

Figure 1: main menu functions

VICTORS SAM	0000
PROGRAMMER SW	FF00
1002	FF40
1101	FF20
	FF80
	FFFF
PROGRAMMER OPERATING SOFTWARE	
	1800
BASIC INTERPRETER	
	8000
	7000
PROGRAMMER "NEW MAP"	
RESERVED	3000
BASIC STRING	38FF
	3A7F
BASIC PROGRAM STORAGE	
	0200
GRAPHICS PAGES	
	0400
SCREEN	
	0400
SYSTEM VARIABLES	0400
	8000

Figure 2: rearranged memory map

small EPROM onto a larger device and the massive 32K 27256 device is necessarily dealt with as two separate 16K halves. Lower and upper address limits can be specified, so that operations may be restricted to only certain parts of an EPROM.

### Continual checking

Intel's interactive Intelligent Programming Algorithm (IPA) is available on the larger devices. Although it may be necessary to apply a voltage for up to 50 milliseconds to change the state of a location, this time can often be reduced and IPA uses repeated one-millisecond pulses. It drastically reduces the time taken to "blow" a device by continually checking whether the required data has already been "burnt-in" at the current location, moving on to the next position as soon as it is successful.

LOAD FROM EPROM transfers an image of an EPROM inserted into the ZIF socket into the "map", and allows you to read (and hence copy) the contents of any EPROM, from any source. EMPTY CHECK examines each location in an EPROM to ensure that it is blank before use, while CLEAR DATA sets all bytes in the "map" area to the equivalent FF state.

EXAMINE/CHANGE provides direct access to the "map" data which is displayed as a hexadecimal dump, and LOAD FROM MEMORY transfers the contents of any block of Dragon memory to the "map" (so for example you could transfer the contents of the Dragon's Basic EPROM). Normal Basic commands are still accessible,

so that loading, saving and modification of programs can be carried out easily.

OUT takes you into Basic from where you can return to the programmer with EXEC MHC002 for a "cold" start, or EXEC MHC005 for a "warm" start where the "map" data is preserved. COMPLEMENT/FILL DATA provides inversion (it's complement) of "map" data or fills with any user-selected byte. MOVE MEMORY BLOCK allows rearrangement within the



"map", and LIST dumps the current "map" contents to screen or printer.

The SET ADDRESS LIMITS function provides selectivity by allowing the action of these commands to be restricted to defined address ranges. VERIFY provides comparison of "map" data and EPROM contents, returning "PASSED" or "FAILED" appropriately, together with error locations and EPROM data. Useful

OVERLOAD ON ZIF SOCKET  
CHECK EPROM CORRECTLY  
INSERTED

Figure 1: Example error message

screen prompts are provided to guide you through each of the functions.

A look at the prices and facilities of small dedicated EPROM programmers shows that the Dragon/programmer combination is a cost-effective solution for users who need to blow relatively small numbers of EPROMs for development or small-scale commercial applications.

Of course the unit allows you to "simulate" EPROMs developed for any machine and although ready availability of an easy-to-use EPROM copier may send shudders through the hearts of cartridge manufacturers, there are home applications which do not raise such moral difficulties. For example, utility programs transferred to EPROM are instantly accessible and do not eat into available RAM.

### High standard

All in all the EPROM programmer is well designed and constructed, very user friendly, and well up to the high standard set by the earlier Dragon add-on from Steve's Electronics.

(For a photograph of the RS232C I/O port interface review published in the September issue send a large, stamped addressed envelope to Dragon User.)

Steve's Electronics is currently working on a card supporting software-selectable sideways ROMs which will allow you to have a whole suite of "firmware" instantly available. For further details contact Steve's Electronics Supply Company, 35 Castle Arcade, Cardiff CF1 2BW, telephone (0332) 41005. ■

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# ~~Hechos en España~~ ~~made in Britain~~

Gordon Ross talks to Eduardo Merigo, President of Eurohard SA

A REVAMPED version of the Dragon 32, together with a whole range of peripherals and add-ons, will be available in shops throughout Britain early this year. It will be distributed by Compuserve through several small distributors and retail outlets, providing a nation-wide network of retail and after sales services.

This news was divulged by Eduardo Merigo, president of Eurohard SA, the Spanish manufacturers of the Dragon at the 1989 show held at the Royal Horticultural Halls in London.

Eurohard SA has begun production of the Dragon 32 and 64 at its plant at Gaceros in Spain, and by Christmas hopes to have sold 25,000 units — its advance sales order.

## CON TODO EL FUTURO CERCA

Porque a pesar de haberse iniciado en la fabricación de Dragon, Eurohard no abandona sus actividades en España. Al contrario, la compañía pretende seguir creciendo y desarrollar nuevos productos. En este sentido, Eurohard se ha comprometido a seguir desarrollando, adaptando y mejorando sus productos. Entre ellos, el Dragon 32, el Dragon 64, el Dragon 100 y el Dragon 200.



An-exception from Eurohard's brochure

Early "bumping" problems meant that the company did not start manufacturing the Dragon until November, a month later than planned. To meet the initial demand for its products Eurohard purchased the remainder of DEC's stocks of the Dragon — 13,000 32's, 64's and disk drives, all at marked down prices.

The Dragon 32 retails for approximately £200 in Spain, and the 64 at £300. At present Eurohard is producing 500 units a day at its manufacturing plant. By early next year it hopes to be the number one selling name in Spain, and at the very worst, said Eduardo, number two.

Eduardo's association with computers is relatively new. He graduated in economics from the University of Geneva and went on to study postgraduate work at a university in Montana in the USA. He has spent most of his working life overseas — 12 years at the Organisation for Economic Co-operation and Development in Paris followed by a few years at a similar organisation in Geneva.

Subsequently, he became a member of the board of Vesa International and started his own computer firm, Chip Electronics, which imported peripherals into Spain for the IBM PC and compatible micros.

His venture into the micro-computer world was out of "intellectual curiosity at first", followed by the realisation that "there was good scope to do a good job".

The initiative to actually start manufacturing Dragons in Spain came from a number of people working for ICS — the Spanish importer of the Dragon.

Eurohard SA was formed in May 1984 with the intention of obtaining a licence to produce Dragons in Spain. An agreement was reached with Dragon Data and was signed just before Dragon Data went into liquidation. The company obtained the sole rights to manufacture Dragons in Spain for sale in Spain and the Spanish speaking world at a cost of £7 per micro.

Having accomplished what they set out to do, Eurohard was then treated to the news that Dragon Data had gone into liquidation and that their agreement meant nothing. The first few meetings with the receiver were difficult. However, eventually Eurohard obtained Dragon Data's assets, including its intellectual property rights and the Microsoft licence for £1 million.

## Enhanced models

Eduardo said that the demise of Dragon Data made Eurohard's life "more difficult, yet more exciting". Not being able to rely on Dragon Data meant that Eurohard had to go it alone.

Eduardo is very much aware of Dragon Data's mistakes. He said the biggest mistake a company could make was "with regard to market forecasts. "Poor management meant that there were not enough components at Dragon Data when there was a large demand for their product, but when demand fell there were too many components in stock.

"In a competitive market companies

cannot afford to make this mistake," Eduardo also found fault with Dragon Data's distribution plans. He believes that large retail stores are the wrong distribution channels as there is no after sales service and little technical information available. Hence the desire to distribute Dragons in the UK through Compuserve. "I was impressed by their level of competence," said Eduardo, "we definitely want distributors of the Compuserve type."



Eurohard's plan is to launch enhanced models of the Dragon 32 and 64 in March. The new models will be called the Dragon 100 and 200 respectively. The 100 will not be available in the UK.

The enhanced version of the 64 will have improved graphics capabilities with perhaps a Viewray multiple interface board. At present negotiations are underway with Motorola. In Spain the enhanced versions will also have Spanish characters. All Dragons will also have the four arrow keys grouped together rather than on either side of the keyboard as at present.

Dragon 32 upgrades will also be on sale. A conversion kit already exists and is available mail order in Spain, and Eurohard is soon to begin boxed manufacturing. Old 32 boards will then be able to be exchanged for 64 boards.

A range of peripherals are also on the way. Eurohard is to offer a Dragon compatible 4 colour printer/ploter, 40 and 100 characters per second printers, a new slim line disk drive using 5 1/4 inch disks, and a sequential 2.8 inch floppy drive. The ■



Eduardo Merigo of Eurohard



later, it is hoped, will do away with the need to use cassette recorders. It will cost about a third of the price of a drive and will take at most eight seconds to load.

Its success depends on Eurohard's ability to reach agreement with software companies to sell software on the drives.

On top of all this, Eurohard also expects to begin production of an MSX machine by the middle of this year. The machine will not be Dragon compatible, and will be sold as a separate line to Eurohard's Dragon products. In Britain it will be distributed by BBC.

### Games machine

Eduardo confirmed that Eurohard obtained the Microsoft license for \$250,000. He sees the MSX micro as a games machine. "MSX is designed for a given market. I do not see it as upwards compatible. It will be produced largely for export and kept for entertainment."

In contrast, Eduardo sees the role of the Dragon as primarily an educational and small business machine. An intensive advertising campaign has begun on Spanish television and, by the middle of next

year, a television programme will start, with Eurohard taking a similar role to that undertaken by Acorn for the BBC.

The Dragon has already been bought by one regional educational authority in Spain, and in some schools there exists a small networking system. A master Dragon is used by teachers, with pupils refreshing on other, smaller Dragons.

Eurohard is keen to encourage and utilize other people's ideas. "It is important to use the creative efforts of other people," said Eduardo. Software writers can contact the company with potential programs for appraisal.

At present most software for the Dragon in Spain has been converted from British titles, but recently Spanish software companies have been getting into the act.

For the small business user, Eurohard intends to use OS-9 as the standard



Five hundred units a day are being produced

operating system. "Fax," said Eduardo, "is a very British product and is not found elsewhere." OS-9 on the other hand is "fairly widespread and through it we hope to introduce people to UNIX".

### Complete system

A complete package, called the Dragon 300, may also be offered to the small business user. This would incorporate a disk drive, operating system and micro — similar to what Compuserve is offering users at present, rather than a product along the lines of the ill-fated Dragon Professional.

A six-month warranty is being offered to purchasers of the Dragon in Spain and Europe. At present, Dragons are being sold in Spain, France, Italy, Greece, Israel and the Scandinavian countries. Once Spain joins the EEC, Eurohard will have an even bigger potential market, and it also intends to take on the Latin American market.

When Eurohard begins operation of its board manufacturing plant, it will also produce add-on boards for the IBM PC and MSX. An agreement has already been reached with two US manufacturers to produce boards for the European market.

Beginning this month, Eurohard intends to start advertising in the UK. "We can't abandon a user base of that size," said Eduardo. "The new peripherals, in particular the sequential drive, should be of interest to British owners of the Dragon." ■

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# Reach for recursion

Paul Gieves introduces programming in recursion

MANY readers may have heard of the term "Structured Programming" and of how Basic isn't capable of such programming. Structured programming really means "ordered", as the writer notes all the various stages in the production, rather than just throwing some code together.

Experts on the subject often throw scorn on humble Basic criticizing it for being unable to support structured programming techniques. However, with a little thought, I believe you can support most ideas. In recent years Pascal has become a popular language because it supports "structured programming". One very interesting feature of Pascal is its ability to support a special type of program structure, called Recursion. This is the subject I wish to convert to Microsoft Basic.

Recursion is a very useful and elegant technique to program with. It allows an enormous amount of code to be reduced to just a few lines. In fact, some problems are so difficult that recursion is the only solution.

In order to understand recursion you must first accept the idea of a "variable". This is the name given to a specific address in the computer's memory that is used to perform calculations. Until now the idea was that if a variable is given a value at the start of the program, then in any subroutines it will have the same value. This is easy to implement and is easier to understand.

```
10 DIM S(100)
20 INPUT N
30 V=1
40 GOSUB 1000
50 PRINT N*FACTORIAL
  V=V*N
60 GOTO 40
1000 IF N=1 THEN
  RETURN
1010 GOSUB 2000
1020 V=V*N
1030 N=N-1
1040 GOSUB 1000
1050 GOSUB 2000
1060 RETURN
2000 "PUSH N
2010 S(N)=N
2020 N=N-1
2030 RETURN
3000 "POP N:3020 N=S(N)
3010 N=N+1 3030 RETURN
```

Listing 1: The factorial routine

However, recursion takes the idea that every program and every subroutine have different variables. That is, if the variable *x* is used in the program and is also used in a subroutine, then they are entirely separate. Changing the value of *x* in the subroutine will have no effect to the *x* in the main program unless you specifically program it to.

When you look at the structure of the DEF FN instruction you will see this is used there. The variable name used to describe the function isn't affected by using it elsewhere. For example:

```
10 DEF FN(X)=SIN(X)/32
```

## Function process

Here the variable "X" is used simply to show how the function is to process its data and not as a specific operation on the contents of "X". Once you have accepted this, also you can proceed to recursion. Recursion uses this idea of "Local Variables" to create its effect. The best way to show this is by the following example.

To find the factorial of a number, it is necessary to multiply itself by one less than the number and by one less than that and so on, until the number is equal to 1. Therefore

```
FACTORIAL OF N = IF N = 1 THEN
  ELSE N * FACTORIAL OF (N-1)
So if N=4 this is how it works:
FACTORIAL OF 4 = 4 * FACTORIAL OF 3
FACTORIAL OF 3 = 3 * FACTORIAL OF 2
FACTORIAL OF 2 = 2 * FACTORIAL OF 1
FACTORIAL OF 1 = 1
Therefore FACTORIAL OF 4 = 4 * 3 * 2 * 1 = 24
```

In order to solve this problem, you can use recursion and so need a language that will allow you to call a subroutine from within itself without destroying the data it holds. That is, the routine FACTORIAL needs to call itself but it mustn't destroy N.

Since Basic does not support "local variables" programmers must do this themselves by using an array as a form of store. Here, whenever the routine is called, its data is stored in a specific section of the array. Then a pointer is moved to another section. This continues until it is time to return from the routine. When this happens, the pointer is moved back to its last lot of data which is then removed. The removal of data continues until the array is empty. This supports the "local variables" and Basic itself will support the repeated call upon a subroutine.

Type in the simple statement below and run it.

```
10 GOSUB 10
```

After a few seconds you will get the message "OM - ERROR", the "Out of Memory" error. This is because the statement has called itself continuously. When a subroutine is called, the position in memory it is called from is saved so that when the routine ends it can return to that point and continue on. Therefore, this statement keeps saving its return address until there is no more room left. This shows that Basic can call a subroutine from within itself.

With this information you can now type in Program listing 1 and run it. Here N is the number typed in and V is the value of the factorial. Subroutine 1000 is the factorial part, routine 2000 saves or "pushes" the variable N into storage and routine 3000 restores or "pops" it back out.

Once this is understood, recursion can be used to create really impressive results. Type in program number 2 and run it. Here, the program first draws a circle on the test screen and then paints it. This routine is handy for low resolution graphics as it is quite quick to type in and is very accurate at filling in a shape.

It works by calling a subroutine to paint the circle at a certain x,y location. The routine first checks if the x,y is in range, if it isn't then it will end. Then the point selected is tested to see if it has already been painted. If it has, then again the routine will return. Once past this point the routine will set the x,y location and will see if it can paint first in the east direction then south, west and finally north.

Once the x,y values are only changed by adding or subtracting 1, there is no need to save them as they will be restored when the routine returns by reversing the addition or subtraction. The routine seems to stop once the shape has been painted, however, the program is still

```
10 CLS
20 G=0
30 GOSUB 1000
40 G=32:G=12
50 GOSUB 2000
60 X=300:Y=100:Z=0
70 GOTO 70
1000 "CIRCLE ROUTINE
1010 "C:COLOUR OF CIRCLE
1020
1030 X=X+1:Y=Y+1:Z=Z+1
1040 DEF FN(X)=X-V
1050 DEF FN(Y)=Y-V
1060 DEF FN(Z)=Z-V
1070
1080 DEF FN(X)=10-110000
1090 FN(Z)
1100 G=Z+10:Z=Z+1:GOTO 30
1110 G=Z+10:Z=Z+1:GOTO 30
1120 GOTO 30
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10000 GOTO 30
```

Listing 2: A circle is drawn and painted

```

10 CLS: CLEAR 1000
20 DIM RK(30),A(30),B(30)
30 INPUT "PLEASE ENTER YOUR WORD":L$
40 J=1:H=LEN(L$):M=1
50 FOR T=1 TO H:W$=VAL-NEXT T
60 CLS
70 PRINT "THERE ARE "V" POSSIBLE"
80 PRINT "WAYS TO WRITE "L$
90 P=J
100 IF H<(P-1) THEN P=P-2:GOTO 100
110 P=P-H
120 S0$=L$
130 GOSUB 1000
140 END
1500 IF 1<H THEN 1550
1610 MID$(S0$,H,1)=MID$(L$,H,1)
1620 PRINT S0$:STRING$(P,128)
1630 GOSUB 4000
1640 RETURN
1650 FOR J=1 TO H:4030 RETURN
1660 GOSUB 2000
1670 MID$(S0$,1,1)=MID$(L$,1,1)
1680 GOSUB 3000
1690 J=J+1:GOSUB 1000
1700 IF J=H THEN GOSUB 4000:GOTO 1100
1710 NEXT J
1720 RETURN
2000 'SWAP L$ (1,J)
2010 T$=MID$(L$,1,1)
2020 MID$(L$,1,1)=MID$(L$,J,1)
2030 MID$(L$,J,1)=T$
2040 RETURN
3000 'PUSH 1:J,L$
3010 R$(0)=J:B$(0)=J:RK(0)=L$
3020 N=N+1
3030 RETURN
4000 'POP 1:J,L$
4010 J=B$(0)-1
4020 J=R$(0):J=B$(0):L$=RK(0)
4030 RETURN

```

Listing 2 (continued) for use rather than understanding

4 running until you hear a loud buzz. This is because the program has to check all of the shape to ensure it has filled it in correctly.

The program can be speeded up by moving the part of line 2040 that checks if the x and y values are in range. This is only advisable if you are certain that the shape will not leak the paint out. If it does leak then this line must exist or an error will occur.

The final listing (program 3) is very difficult to explain as it is heavily involved

with recursion and so I merely present it for your use if not for your understanding. It is a better version of the various programs used to find the permutations of various letters and numbers.

Each permutation is given, rather than a random press sample dependent on the RND function. It will accept quite large letters, that is, the entire alphabet, but it takes a great deal of time to go through more than about 5 or 6 characters.

There are many textbooks available that discuss recursion (see panel) and I suggest

that you refer to these if you want to try any further experiments. Even if you don't understand this topic you can still use the "Paint" and "Permute" routines in your own programs. ■

**Pascal: An Introduction to Mathematical Programming by W. Finlay and D. A. Watt (Pitman)**

**Inside the Dragon by D. Smart and I. Sowerby (Addison-Wesley)**  
 **Computer Science: A modern introduction by Goodenough and Lister (Prentice-Hall)**  
 **A structured programming approach to data by D. Colman (Macmillan Press)**

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## Stitchet

From Graham Smith in Bristol

This is a short program to produce an interesting circle stitching pattern. My daughter enjoyed typing in a similar type of program which produced a rectangular

based pattern. I therefore produced this totally different program of similar length to maintain her interest. At present the shorter and simpler programs are much in demand by my children.

```
10 DIM X(30),Y(30)
20 P=0:C=0:D=0:E=2:F=0
30 FOR N=1 TO 10:F=P+20
40 X(N)=INT(122+(195-COS(P/(180/3.142)))
50 Y(N)=INT(196-(195+SIN(P/(180/3.142)))
60 NEXT
70 PHASE4,1:SCREEN1,B:PCLS
80 IF FC2 THEN PCLS
90 C=C+1:IF C=10 THEN 150
100 A=0:B=C
110 A=A+1:IF A=17 THEN GOTO 170
```

```
120 B=B+1:IF B=17 THEN B=1
130 LINE(X(A),Y(A))-(X(B),Y(B)),PB
140 GOTO110
150 C=C+5:E=1:IF E=5 THEN D=1
160 IF D=5 THEN E=2:D=0:C=0
170 F=F+1:IF F=4 THEN F=0
180 GOTO 70
190 FOR I=1 TO 10:PLAY"T1000G0DEFG
200 DEFSC":NEXT:GOTO 80
210 REM *70* CHANGE PHASE TO 3
220 REM *80* ADD E AFTER PCLS
```

## Sound

From R Storage in Cornwall

THIS PROGRAM makes good use of the Dragon's AUDIO command to produce a colourful display synchronised to the changes in a piece of music. You can use a cassette tape or feed the output of a HiFi system into the cassette input. Some cassette recorders output an amplified signal on their telephone output when set to record so you can even use a microphone as a sound source.

The program also demonstrates the use of USAF calls to pass parameters between

Basic and machine code. The first call simply counts the number of transitions on the cassette input. IOS PORT AD, is a time interval given by parameter T, the count being returned to variable A. After waiting for a significant change in pitch, a colour is chosen according to the value of A and two more user subroutines are used to shade one quarter of the text screen.

High frequency noise will ruin the effect, so a fairly "clean" sound input is required.

### Program notes

- 10-30 Clear screen, turn on cassette sound and reserve machine code space.
- 40-60 Machine code to read the cassette.

- 60-70 Machine code to colour the next quarter of the screen down.
- 80-90 Machine code to colour the next quarter of the screen up.
- 100-120 Initiate machine code, start tape and set up count period.
- 130-160 Read signal, modify T to accommodate to the signal and loop if the pitch has not changed much.
- 180 Select colour, roughly in order of luminosity.
- 200 Colour the screen, moving upwards for increasing pitch, downwards for decreasing pitch.
- 210-230 Tidy up and loop.
- 230-240 Pause machine code.

```
1 *****
2 ** SOUND-TO-LIGHT **
3 **
4 ** ROBERT STRANGE **
5 ** <C> AUG 1984 **
6 *****
10 CLSO
20 AUDIO ON
30 CLEAR200,17777:A=20000
40 DEF USR0=A:GOSUB230
50 DATA 80,88,20,1F,1,5F,86,FF,20,
Y1,FE,27,1,5C,97,FE,30,1F,26,FF,2,4F
,7E,8C,37,*
60 DEF USR1=A:GOSUB230
70 DATA 88,88,20,7E,FC,8C,6,0,24,3
,8E,4,0,86,80,E7,80,4A,26,FB,9F,FC
,37,*
80 DEF USR2=A:GOSUB230
90 DATA 80,88,20,7E,FC,30,89,FF,0,
8C,4,0,24,3,8E,5,80,86,80,E7,80,4A
,26,FB,9F,FC,39,*
100 POKESHPC,4:POKESHFD,0
110 ROTURON
120 T=8000
```

Continued on page 28



```

130 A=USR00(1)
140 C=INT(A/16)
150 IF C=0 THEN T=T+1.1
160 IF C=8 THEN C=0:T=T*.9
170 IF T>30000 THEN T=30000
180 IF ABS(A-C)>20 THEN 130
190 D=VAL(MID$(C"128,191,175,239,22
3,143,255,159,207",C*4+1,3))
200 IF A#E THEN D=USR02(D) ELSE S=
USR01(48)
210 E=A
220 GOTO130
230 READ D:IF D#>"*" THEN POKE A
,WAL("SH"+D):A=A+1:GOTO230

```

```

240 RETURN
250
260 * NOTES ON MACHINE CODE
270
280 * JSR #0020 CONVERTS THE
290 * BASIC NUMERIC VARIABLE
300 * TO AN INTEGER IN THE
310 * D-REGISTER.....
320
330 * JMP #0C17 CONVERTS THE
340 * VALUE IN THE D-REGISTER
350 * TO A BASIC VARIABLE AND
360 * RETURNS TO BASIC.....

```

## Ski-run

From Michael Oliver of North Yorkville  
SKI-RUN is a game for one player. When  
RUN, the computer will print out the  
instructions, they you will have to wait for  
about 3 minutes for the computer to set up  
the screen in PMODE4. The program  
takes up approximately 18K of memory.

The idea of Ski-Run is to guide a skier  
from the top of a ski slope to the bottom.  
You have a set course to follow and you  
have to keep between the flags. You get  
four lives to start with and you lose one if  
there when you crash into a flag.

The cursor keys are used for moving the  
skier in the appropriate direction. When an

arrow key is pressed, the skier will auto-  
matically travel in that direction until  
another cursor key is pressed.

The data statements between lines 140  
and 375 consist of a number between one  
and three. Number one prints a fir tree on  
the screen, number 2 a flag and 3 a patch  
of snow on the screen.

### Program notes

#### Lines

10-680

The procedure for setting  
up the screen.

140-375

The data for printing the  
screen.

670-910

The main routine for the  
game.

990-1020

The procedure for when the  
game has ended.

1030-1110

The procedure for when the  
player has won.

1120-1170

Title page.  
Instructions.

#### Variables:

CHAR

The character

SCREEN

The variable to set up the  
screen.

OK

Checks the screen for colli-  
sions.

LIFE

How many lives you have  
left.

XX

The old position of the skier.  
(The "X" coordinate).

YY

The old position of the skier.  
(The "Y" coordinate).

X

The updated position of the  
skier.

Y

The updated position of the  
skier.

TM

The time it has taken you.  
The fastest time.

```

10 DIM CHAR(4,60),SCREEN(32,24)
20 DIMCK(32,24)
30 REM DOWNHILL SKI-ING
40 REM © 2/6/1984
50 GOSUB 1100
60 CLS
70 PRINT @ 135,"setting up screen"
80 PRINT
90 PRINT TAB(10);"PLEASE WAIT"
100 PRINT:PRINT TAB(5);"3 MINUTES,
15 SECONDS"
110 REM
120 REM DATA FOR PRINTING OUT THE
SKI RUN
130 REM
140 DATA 1,1,1,1,1,1,1,1,1,2,1,1,1
,1,1,2,1,2,1,1,1,1,1,1,2,1,1,1,1
,1,1
150 DATA 1,2,1,1,1,1,1,1,2,3,2,1,1
,1,2,2,3,2,2,3,2,1,2,2,1,2,3,2,1,1,1
,1,1
160 DATA 1,3,2,1,1,1,2,2,3,3,3,2,2
,2,3,3,3,3,3,3,2,3,3,2,3,3,2,1,1
,1,1
170 DATA 1,3,3,2,2,2,3,3,3,3,3,3,3
,3,3,3,3,3,3,3,3,3,3,3,3,2,1
,1,1
180 DATA 1,3,3,3,3,3,3,3,3,2,3,3,3
,3,3,3,2,3,2,3,3,3,3,3,2,3,3,2
,1,1,1

```

```

190 DATA 1,2,3,3,3,3,3,3,2,1,2,3,3
,3,2,2,1,2,1,2,3,2,2,2,2,3,3,3,2,1
,1,1
200 DATA 1,1,2,3,3,3,2,2,1,1,1,2,2
,2,1,1,1,1,1,1,2,1,1,2,3,3,3,2,1,1
,1,1
210 DATA 1,1,1,2,2,2,1,1,1,1,1,1,1,1
,1,2,1,1,1,1,1,1,1,2,3,3,3,2,1,1,1
,1,1
220 DATA 1,2,2,1,1,1,2,2,2,1,1,1,2
,2,3,2,1,2,1,1,2,2,3,3,3,2,1,1,1,1
,1,1
230 DATA 2,3,3,2,1,2,3,3,3,2,1,2,3
,3,3,3,2,3,2,2,3,3,3,3,2,1,1,1,1,1
,1,1
240 DATA 2,3,3,3,2,3,3,3,3,2,3,3,3
,3,3,3,3,3,3,3,3,2,1,1,1,1,1,1,1
,1,1
250 DATA 2,3,3,3,3,3,3,3,3,3,3,3,3
,3,2,3,3,3,3,3,3,2,1,1,1,1,1,1,1
,1,1
260 DATA 2,3,3,3,3,3,2,2,2,2,2,3,3,2
,3,1,2,3,2,3,3,2,2,2,1,1,1,1,1,1,1
,1,1
270 DATA 2,3,3,3,3,2,1,1,1,1,1,2,3,2,1
,1,1,1,2,1,2,2,1,1,1,1,1,1,1,1,1
,1,1
280 DATA 2,3,3,3,2,1,1,1,1,1,2,1,1
,1,1,1,1,1,1,1,1,1,1,2,1,1,1,1,1
,1,1

```

Continued on page 97

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```

290 DATA 1,2,3,3,3,2,1,2,2,1,1,1,1
,1,1,1,1,1,1,1,1,1,2,3,3,1,1,2,2
,3,2
300 DATA 1,2,3,3,3,3,2,3,3,2,1,1,1
,1,1,2,1,1,1,1,1,1,2,3,3,3,2,2,3,3
,3,3
310 DATA 1,1,2,3,3,3,3,3,3,2,1,2
,1,2,3,2,1,1,1,1,2,3,3,3,3,3,3,3
,3,3
320 DATA 1,1,1,2,2,3,3,3,3,3,3,2,3
,2,3,3,3,2,2,3,2,3,3,2,3,3,3,3
,3,3
330 DATA 1,1,1,1,1,2,3,2,2,3,3,3,3
,3,3,3,3,3,2,3,3,3,2,1,2,3,3,2,2
,2,2
340 DATA 1,1,1,1,1,1,2,1,1,2,3,3,3
,3,3,2,3,3,3,3,3,2,1,1,1,2,2,1,1
,1,1
350 DATA 1,1,1,1,1,1,1,1,1,1,2,3,2
,3,2,1,2,3,3,3,3,2,1,1,1,1,1,1,1
,1,1
360 DATA 1,1,1,1,1,1,1,1,1,1,1,2,1
,2,1,1,1,2,2,3,2,1,1,1,1,1,1,1,1
,1,1
370 DATA 1,1,1,1,1,1,1,1,1,1,1,1,1
,1,1,1,1,1,1,2,1,1,1,1,1,1,1,1,1
,1,1
380 REM STORE ALL DATA IN A 32*
  34 ARRAY
390 FOR Y=0 TO 23
400 FOR X=0 TO 31
410 READ A
420 SCREEN(X,Y)=A
430 CH$(X,Y)=A
440 A=0:NEXT X,Y
450 REM SET UP CHARACTERS
460 DATA 239,231,199,195,131,0,239
,255
470 DATA 143,179,188,179,143,159,1
59,255
480 DATA 255,255,255,255,255,255,2
55,255
490 DATA 239,131,49,49,245,187,187
,57
500 FOR CH=1 TO 4
510 FOR B=0 TO 7
520 READ C
530 CHAR$(CH,B)=C
540 NEXT B,CH
550 GOSUB 1120
560 REM SET UP SCREEN IN PMODE4
570 PMODE 4,1:PCL85
580 FOR Y=0 TO 23
590 FOR X=0 TO 31
600 A=SCREEN(X,Y)
610 PLAY"TS555"PLAY STR$(A)
620 FOR B=0 TO 7
630 POKE 1536+(Y*256)+(B*32)+X,CH$
R$(A,B)
640 NEXT B
650 NEXT X,Y
660 PCOPY 5 TO B
670 HT=484

```

```

680 CLS:PRINT:PRINT"PRESS spacebar
TO START THE GAME"
690 IF INKEY$="" THEN 670
700 PRINT:PRINT:PRINT TAB(10);"good
luck!"
710 FOR A=1 TO 3:PLAY"03T255CEDCED
CEDFEDFEDFEDBAGBAG":NEXT A
720 REM====GAME=====
730 TIMER=0
740 FOR LIFE=4 TO 1 STEP-1
750 PMODE 4,1:SCREEN 1,1:PCOPY 5 TO
B:B
760 X=2:Y=4
770 XW=0:YW=0
780 X=X:Y=Y
790 AH=INKEY$
800 IF AH=CHR$(8) THEN XW=-1:YW=
0
810 IF AH=CHR$(7) THEN XW=1:YW=0
820 IF AH=CHR$(94) THEN YW=-1:XW
=0
830 IF AH=CHR$(10) THEN YW=1:XW=
0
840 X=X+XW
850 Y=Y+YW
860 IF X=32 AND Y>1& THEN GOTO 103
0
870 IF CX(X,Y)<>3 THEN 940
880 FOR B=0 TO 7
890 POKE 1536+(Y*256)+(B*32)+X,CH$
R$(A,B)
900 POKE 1536+(Y*256)+(B*32)+X,2
55
910 NEXT B
920 GOTO 780
930 GOTO 930
940 FOR B=0 TO 7
950 POKE 1536+(Y*256)+(B*32)+X,2
55
960 NEXT B
970 PLAY"01T106BDFESC"
980 NEXT LIFE
990 PLAY"PS1T302L20L4CL13CL20L40B
L8DL4DL8CL4CDL18B02L2C"
1000 CLS0
1010 PRINT @ 139,"game"+STR$(0+2,
1281)+"over";
1020 FOR A=1 TO 2000:NEXT A:GOTO A
80
1030 FOR B=0 TO 7:POKE 1536+(X-1)+(
Y*256)+(B*32),255:NEXT B:FOR A=1 TO
5:PLAY"05T255CDFBAGBAG":NEXT A
1040 CLS
1050 PRINT:PRINT TAB(19);"you have
made it"
1060 TH=INT(TIMER/50)
1070 PRINT"YOUR TIME IS";TH;"SECON
DS"
1080 IF TH=0 THEN HT=TH
1090 PRINT"FASTEST TIME";HT;"SECON
DS"
1100 FOR A=1 TO 5000:NEXT A
1110 GOTO 680

```

Continued on page 38

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```

1120 CLS
1130 PRINT # 140,"ski"=STRING$(12,1
260+"run";
1140 PRINT # 207,"by";
1150 PRINT # 260,"michael"=CHR$(12
$1+"silver";
1160 SCREEN 0,1
1170 RETURN
1180 CLS
1190 PRINT TAB(7);STRING$(10,"=")
1200 PRINT TAB(7);"WELCOME TO ski
run"
1210 PRINT TAB(7);STRING$(10,"=")
1220 PRINT:PRINT"  THE IDEA OF
ski run IS TO GUIDE A SKIER FROM
THE TOP OF A HILL TO THE BOTTOM."
1230 PRINT:PRINT TAB(7);"SOUNDS EA
SY?"
1240 PRINT:PRINT"  NOT IF YOU
HAVE A CERTAIN COURSE TO FOLLOW AN
D YOU HAVE TOKEEP BETWEEN THE FLAG
S."
1250 PRINT # 456,"press spacebar";
1260 SCREEN 0,1
1270 IF INKEY#<>" " THEN 1270
1280 FOR A=2 TO 4: SOUND A#50,1:INEX
T A
1290 CLS
1300 PRINT:PRINT:PRINT"  USE TH
E FOUR ARROW KEYS TO MOVE THE SKIE
R. WHEN YOU PRESS AN ARROW KEY, T
HE MAN WILL TRAVEL IN THE SAM
E DIRECTION UNTIL ANOTHER KEY I
S PRESSED."
1310 PRINT"  YOU HAVE FOUR LIVE
S TO DO AS BEST AS YOU CAN."
1320 PRINT # 456,"press spacebar";
1330 SCREEN 0,1
1340 IF INKEY#<>" " THEN 1340
1350 FOR A=2 TO 4: SOUND A#50,1:INEX
T A
1360 CLS:PRINT # 137,"good"+STRING
$(2,1280)+"luck"
1370 PRINT # 200,"(YOU'LL NEED IT)
"
1380 FOR A=1 TO 5:PLAY"OST255CFABE
D6FCBACFEDA":NEXTA:FOR A=1 TO 3000
:INEXTA
1390 RETURN

```

## Ultra utility

### From A Fielding in Herts

THIS is a short utility which will help Ultradrive users. The ability to use the DIR function within a program enables a print-

out of the directory to be obtained. (In this case to a GP100A Printer.)

The main part of the listing are lines 120 to 230. These are a text screen dump. (That is converting the data in memory locations \$H400 to \$H5FF to ASCII character numbers, then sending characters to the printer in rows of 30 followed by a carriage return.)

I place this program on tape immediately

after finishing, making it easy to keep a current record of my data files and programs.

### Program notes

Lines 10 to 60 calculate the circular co-ordinates.  
Lines 70 to 190 draw the pattern.  
Lines 140 and 200 add sound.  
Lines 210 to 230 are for colour television.

```

10 "#####"
20 "A DIRECTORY TO PRINTER #
30 "A BY R.H.J.FIELDING #
40 "#####"
50 CLS
52 INPUT"THIS PROGRAMME CATALOGUES AN
ULTRADRIVE TAPE TO A GP100A PRINTER
J.PRESS enter TO CONTINUE."K
60 PRINT#2,CHR$(15)
70 INPUT"TAPE NO";T:INPUT"SIDE";S#
80 PRINT#2,"TAPE";T,"SIDE ";S#
90 PRINT#2
100 CLS
110 DIR
120 FOR Y=0 TO 15
130 FOR X=0 TO 31
140 P=PEEK(X+32KY+$H400)
150 IF P<64 THEN GOTO 170
160 P=P/96:GOTO 200
170 [PP]=64ANDP:(96THEN P=P-64
180 [PP]=96ANDP:(128THEN P=P-64
190 IF P=96 THEN P=32
200 PRINT#2,CHR$(P);
210 NEXT X
220 PRINT#2
230 NEXT Y

```

TAPE 1	SIDE B	
directories		
FILENAME	TYPE	LEN START EXEC
DIR	BPBIC	#0207
STISTICS	BPBIC	#158C
RH64	CODE	#208A #2080 #4000
CGP#64	BPBIC	#0A2A
END OF FILES		



# Bookbytes

Send books for review to *Dragon User*,  
13-15 Little Newport Street, London  
WC2H 9PP.

**Book:** *Basic for your Dragon 64/32 made easy*  
**Author:** Gerry Marshall  
**Publisher:** Arrow Books  
**Price:** £3.95

THERE ARE more and more books for the Dragon coming on the market, each looking for a new angle and a new page to fill. This one is designed to capture the market created by the growing number of Dragon 64 owners. A good number of these are ex-32 owners who have upgraded their monies.

The thin addendum supplied by the manufacturers of the 64 posing inadequate, what is needed is a book exploring the differences between the machines and giving

is that the full run of all home graphics and many pages does not need to be commensated even with very large programs. However, only two pages of the book are devoted to home graphics. This is despite the forward stating that: "The Dragon 64 (has) ... impressive graphics and sound production."

Some very elementary Basic can be learnt from this book — but if you've got beyond PRINT, INPUT, READ, DATA and very simple file handling you will be wasting your time with this one. Only 20 statements are covered and the programs given for you to type in — for example a "Invaders" game on the test screen — will teach you little.

Mike Harrison



ing the user some new ideas on utilizing the 64's larger memory. Nevertheless also need a comprehensive guide to the full Dragon Basic. Unfortunately, this book fails to measure up on both counts.

I could find nothing on the whole book specifically pertinent to the 64. No mention of the use of the auto-repeat facility, nor the use of the PEEK interface. The word EREG — which puts the machine into 64K mode — does not appear, nor the use of the USER function key that the bug has been fixed out.

One chapter mentions buttons and robots that you can use with the machine, but the most important accessory for 64 users — a disk drive — and the difficulties caused by the overwriting of the cartridge port in 64 mode get no space.

One of the advantages of the increased memory space

**Book:** *Programming the Dragon 32*  
**Author:** Peter Lafferty  
**Publisher:** Newnes Microcomputer Books  
**Price:** £5.95

ONE OF the most fearless tasks must be to write the instruction manual which accompanies every microcomputer. To have to acquire the absolute novice who has just unpacked his first computer, and, at the same time cover the intricacies of the many advanced features of the machine, must be a daunting prospect. It is perhaps inevitable, considering the dual role that these manuals have, that many come in for a fair amount of criticism.



With this in mind, it is a pity that a copy of *Programming the Dragon 32* is not included with every Dragon computer. Here is a clearly written account of how to use the Dragon, starting with the Basic principles, and in which the author never loses track of the fact that the reader might be programming for the first time. This is not to say that the more sophisticated commands are not dealt with, again in a straightforward and easy-to-understand manner. The author is obviously very well acquainted with the Dragon and some of its idiosyncrasies and gives some hints and advice throughout the book that even computer "buffs" might find very useful.

However, it is at the beginner that this book is primarily aimed, and it is packed with both short routines illustrating the effects of the various commands, and also with lots of complete listings (more of them particularly long), covering programs from "space-invaders" and fruit machines to digital clocks and Las Vegas games.

Throughout, it is extremely well-written and informative, and its easy-going style might be said to take the reader on a gentle stroll along the byways of Basic, as opposed to many manuals which appear to make programming resemble an assault on the north face of the Eiger. Definitely a read for all but the "expert".

Gordon Lee

**Book:** *Creating Adventure Games on your Dragon 32*  
**Author:** Clive Gifford  
**Publisher:** Interface Publications  
**Price:** £5.95

HOW ABOUT setting your next adventure game in your own home?

... attacked in porch by milkman ...  
... ran or fight?  
... spill coffee on carpet ...  
... move chair or hope it matches your stain?

Well, perhaps nothing exciting happens around your house, but imagination can run riot. We now have adult oriented rock, so why not adult oriented adventure — Ed De-

rek and all. Anything is possible with the help of Clive Gifford's book.

The book not only teaches you how to structure and create adventure games but also how to customise them to your own whims and fancies.



Adventure gaming can offer a real challenge to those fond of alien juggling and this book contains five full programs each of a different type of adventure and each detailed in sections describing their function. As is the strength of this type of game — the whole is so much more than just the sum of the parts.

Clive Gifford's style is to show how four elements in the program: initialisation, the control loop, handlers and the subroutines consequent upon these, interact and can be modified to suit your own ideas. These modules, and a few general purpose ones he also lists, are the key to adventure programming.



The book is easily digested and the listings also include games procedures and techniques and a chapter on how to add sound and graphics to your programs.

Mike Harrison

## Wizard Software



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- "Fantastic... If you've got a Dragon what on earth else do you need?" — PCW, May 1984
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# MIKE GERHARDS ADVENTURE TRAIL

THIS MONTH begins with a plea from reader M. A. Peakes of Doss in Norfolk, whose daughter was given a copy of *El Diablo* last Christmas, and Christmas 1984 finds the family Peakes still stuck in this diabolical adventure. The demise of Dragon Data means there's no one they can contact for further clues, and having only so far been able to obtain the Cross, they're anxious for some hints on how to proceed further. This is an adventure I've not seen, so if any readers out there have got beyond the Cross, perhaps they'd let me know and I'll print the clues or pass them on to Dossed of Doss. Of course, if anyone has a spare copy of the adventure ...

Talk of presents too is a letter from a reader in Kent, whose name I won't give as he was asking for advice on adventures he could give his son, who he describes as a bright nine-year-old. Resisting the temptation to suggest *El Diablo*, I recommended the various *Mysterious Adventures* from Channel 8 Software, who are now retelling their titles for £5.95 down from £9.95. I suggested the *Mysterious Adventures* because they're fairly straightforward, with every object having a purpose, and although it's difficult to know what will suit a particular person, I think the Channel 8 titles would suit that age adventurer.

Also recommended as possible gifts were the four recent Dragon Data graphics adventures: *Sea Quest*, *Calico Island*, *Black Sanctuary* and *Shenangoes*. Another reader has written in about *Calico Island*, which is quite a tricky one, and the letter is interesting because I'm not sure if the reader hasn't been led up the garden path somewhere along the way. *M. M. Blackwood of Bristol* (you readers are so formal: you are allowed to put your Christian names, you know!) says that "having found the treasure I have been unable to find out where to return it to. At the beginning of the adventure I did not locate the professor's notes, and perhaps these would have contained a clue. Another problem is that having dithered with Trader Jack for the keys he had, I could not then find the teleporter device, which had disappeared from the marshy field in order to return to the professor's study to find out if the keys held his keys."

I've a pressing suspicion that the tra-

sure this reader refers to may be the jewellery that you find fairly early on in the game. The reason for that is that what you want from Trader Jack is the machine, not the keys. You then use the machine to track a path through the jungle, and later on you find a cave for the jewellery, leading on then to enable you to get the main treasure, which is a crown. This you then take back to the professor's laboratory and drop it, to complete the adventure. Don't expect fireworks and razz-a-mazz, though, for like many adventures the ending is rather disappointing ... you get all that way and then the first thing they ask you is if you want to play again.

In *Calico Island*, I haven't located the professor's notes either, but it didn't stop me getting through, and I've never had the experience of losing the teleporter device that whisks you from the laboratory to the marshy field. Maybe other readers can shed some light on this mysterious disappearance.



A device of another kind in the Channel 8 series, *Time Machine*, is available for the Dragon 32 and 64 for £5.95, both versions being on the same tape. The running program knows which machine you're loading it into and reads accordingly. The *Mysterious Adventures* series all work to the same format, and regular readers will be getting as tired of reading what this is as I am of writing it, so we'll give it a miss this month ... and un-regular readers only have themselves to blame.

All adventures have a maze of some kind, but *Time Machine* starts you off in one: "It's in a dense fog on the moors.

East: NORTH SOUTH EAST WEST." Typing "T" for Inventory informs you that "I'm carrying: Not a sausage!" Fair enough, so nothing to chop, but simply trial and error to find your way out of the foggy moor. You can come back later when you are carrying objects and discover the maze is very simply constructed indeed.

The reason you're out on the moors, on such a winter night, instead of cosily staying indoors and watching "Minder", is that you see an odd news reporter from the *Talkingham* and *Dunsty Gazette*. You've been removed from your usual duties of reporting local flower shows and pensioners' birthdays to investigate strange goings-on at the deserted house on the moors. Having seen plenty of B-movies you should have more sense, but local people have seen strange lights and heard weird noises, so off you go to discover what the eccentric Dr Foster is up to.

From the moor you can make your way to the house, and a doorway containing gloves and a bell. RING BELL, of course, but two dings and two dings later nothing has happened, so round the corner to find a window. Years of brutal arcade-game playing ensure you don't hang about being all nimbly-parmy, you SMASH WINDOW! Having naturally taken the precaution of wearing the gloves first — we don't get caught like that! Inside the house you make your way to the cellar, where there's a Strange Machine and a cassette recorder, and the latter provides you with the message: "Find the three prisms that control my machine. Rescue me!"

Now don't worry your head about how someone who's obviously been sent off in a Time Machine can possibly have inserted a message like that if it is a cassette machine that's been left behind, but instead GO BACKWARDS to see that there are indeed three empty sockets just waiting you to INSERT PRISMS, not to mention two buttons marked "FOR" and "REW". The point, then, is in for the prisms, and this will take you via dinosaurs in swamps to sailing ships and sphinxes — the usual *Mysterious* fodder, though there seemed to be less in this adventure than in some of the others ... or maybe I just haven't got far enough into it yet, if you've tried one before then you'll know what to expect, but if you haven't then I wouldn't particularly recommend starting with this one ■

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If you've got a technical question write to Brian Cudge. Please do not send a S&A as Brian cannot guarantee to answer individual inquiries.

## Dragon Answers

### Character DRAWing

Could you please tell me if there is any other way of moving DRAWed characters, other than using the SET and PUT commands on the high resolution screens. I understand that STVG works but I don't know how.

Chris Murr  
Dorset  
Suffolk

I think the method you are referring to is to use the Draw command with variable x,y co-ordinates given using STVG. To draw an image of x,y from the string 00 use the following: DRAW

"BM" + STVG(0) + "," + STVG(1) + 00

You can use a similar method to obtain visible colours, angles and scale sizes in the draw command.

### Cassette lead

COULD you please tell me where I can purchase a Dragon 32 lead which connects to the cassette recorder. I have tried everywhere in Exeter but no shop stocks them.

Harvey Staddon  
Tiptonham  
Exeter

ONCE again the Dragon's similarity to the Tandy Color page up, in fact the Dragon's entire cassette lead is identical to the Tandy Color's. You can get one of these from your local Tandy store for a few pounds, ask for catalogue number 26-1207.

### Game error

I OWN a Dragon 64 computer and a few months ago I bought a game called Up Pericoose from Beyond. I enjoyed this game so I bought a similar one called Kingpistol, however, when I loaded this I got a syntax error in line two which was:

2 U =USR 0000: RETURN

I have had the game replaced several times but I have always had this problem. Please could



you tell me if it is a problem with the Dragon 64 or the game.

Paul Wootton  
Dunfermline  
Fife

ALTHOUGH the Dragon 64 operates as a Dragon 32 when first turned on, there are one or two bugs in the 32S machine which have been removed from the Dragon 64's Basic. One of these is the need to put an additional character before the USR number (in this case the "0"). To get the program to work on your Dragon 64, update line 2 with: 2 U = USR0000: RETURN

This is printed out in the Dragon 64 supplement booklet, but on reflection it would seem better if the bug had been left in the 64's ROM.

### Bridge partner

I HAVE noticed a few games for the Dragon 32 for simulated card games such as Crib and Pontoon. Could you please inform me if there is a game of Bridge on the market or if one is in the process of being written. I have tried all the shops in this area without success.

P G Fry  
Barnstaple  
Devon

BRIDGE data has just released a Bridge game before they ran into difficulty. This program came on cartridge with games on an accompanying cassette. The game can be played with either the keyboard or joystick.

As with most of Dragon Data's software, the game can now be obtained from Touchmaster, Kandy Industrial Data, Wargame, Post Taitex, or Microgame

DATA 2PE. You should refer article number B41000. The game costs £15.95 plus £1 post and packing.

### Graphics savings

I AM currently writing a graphics program for my Dragon 32 and I read recently that there was a command for saving a graphics page by the use of CLEAR00.

I would be grateful if you could tell me the command and also how to load it back into the computer.

Pam Dragon  
Conford  
Hants

THE CLEAR00 command can be used to save graphics pages quite easily. To name the graphics currently displayed use:

CSA000 "Bismare" , PEEK(100) + 256 + PEEK(101) , Peek(102) + 256 + PEEK(100), 0

This gives the start and end address of the current graphics selected and saves this block of RAM. If you know the addresses you can use them directly of course, but using this method will also take account of disks and so on.

To reload the graphics, simply use CLS000 "Bismare". You can specify an offset in the CLS000 command if you don't want the graphics loaded back in the same place.

### DeltaDOS or DragonDOS

I OWE a Dragon 32 with a Dragon Data disk system and I am having a great deal of trouble with a file

handling system I am trying to write for my father's business.

I have heard that you can buy a separate Delta disk operating system for around £60 and I was wondering whether it would be compatible or could be made compatible with Dragon Data's drives.

W F Alexander  
Ingleton  
Lancs

THE FILE handling system included with DragonDOS is not particularly user-friendly, but is probably quite capable of doing what you need. You can buy the DeltaDOS from Canams, which will operate the Dragon Data drives, but this DOS will do no more than DragonDOS, certainly not enough to justify the extra cost. You would do better to invest the money in a professional operating system, such as DOS or Plan, both of these offer very good file handling. What is really needed is a good book on file handling using DragonDOS, but to my knowledge there isn't any.

### Clearing addresses

COULD YOU please help me with the following two questions:

(a) How is it possible to obtain the start, end and exec locations from a file on a "DragonDOS" disk?

(b) Is the ROM "clear-screen" routine available to assembler programs and if so what is its location?

David Reed  
Harnchurch  
Essex

WITH THE DragonDOS cartridge attached, the following locations contain the addresses you want. ROM hex:

1010:1010 - Start address of machine code  
1020:1021 - Length of machine code program  
1022:1023 - Entry (hex) address

The ROM clear screen routine can be used from assemblers to clear the screen to green, see JER 47106, and to clear to a particular character, load the "B" register with the code and use JER 47132. These routines also reset the print position, which is stored in locations 101:101, to the top left of the next screen.

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# Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

£0.00	£2.00	£3.00	£4.00
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£2.00	£2.10	£2.30	£2.60
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Please continue on a separate sheet of paper.

I make this..... words, at 20p per word so I enclose .....

Name .....

Address .....

Telephone .....

Please cut out and send this form to: Classified Department, Dragon User, 12-13 Little Newport Street, London, WC2N 3LD

# Competition Corner

Answers to Competition Corner,  
Dragon User, 12-19, Little Newport  
Street, London WC2E 9PP.



THERE are times when an apparently straightforward piece of programming can give rise to problems if one of the basic — though rather esoteric — features of the Dragon is overlooked.

## Trigonometry

Take the following simple problem: You wish to determine the height of a flagpole, and find that at a distance of 80 feet, the top of the flagpole has an elevation of 35 degrees from the ground. Elementary trigonometry tells us that the side of a right-angled triangle opposite any given angle (the flagpole) is equal to the tangent of that angle multiplied by the side adjacent — in this case the distance along the ground to the flagpole.

# Record space

Gordon Lee sets the problem,  
Cable Software provides the prizes

radiant. Fortunately, it is easy to convert degrees to radians and vice versa.

To convert degrees to radians divide by 180 (approx. 57.29578). To convert radians to degrees multiply by 180.

Using this fact, the correct height of the flagpole mentioned earlier would be given by:

PRINT TAN(35/57.29578/90  
which gives 63.0185 ... i.e. the correct answer.

Whilst on the subject of trigonometric ratios, the sine, cosine and tangent of an angle can be accessed directly from the keyboard using the commands SIN, COS and TAN respectively. The inverse of the tangent is also available (ATN) but not, unfortunately, the inverse of either sine or



corresponding angle. The letter *s* in the formula refers to half the perimeter — that is  $(a + b + c)/2$ .

$A + B + C = 180$  degrees or  $\pi$  radians  
 $A = \sin A = b / \sin B = c / \sin C$   
area of triangle =  $\frac{1}{2}ab \sin C = \frac{1}{2}bc \sin A = \frac{1}{2}ca \sin B$   
 $\tan(A/2) = \frac{1}{s} (s - a) \tan(B/2) = \frac{1}{s} (s - b)$

## Disc table

Here is this month's competition problem: I have two gramophone records, one 12 inches in diameter, and the other one 10 inches. They are lying on a table with the 10 inch disc on top. If this smaller disc is entirely contained within the area of the larger, the area of table covered will be at a minimum (equal to the area of the 12 inch disc), but the area of overlap of the two



So we might type in to the computer  
PRINT TAN (35/90)  
This would give us an answer of 42.6433  
but, which we might reasonably suppose  
is correct. However, there is one important  
feature of the Dragon — and most other  
computers — that we have forgotten. This  
is that all angles handled by the computer  
must be given in radians, not degrees. It  
is perhaps unfortunate that in a world where  
the degree is the standard unit of angular  
measure this should be the case. It is  
much easier to visualise what is meant by  
35 degrees rather than 0.6108852382

cosine. These can be calculated indirectly  
from the ATN function using the formulae:  
Inverse sine = ATN (X/SQRT(1 - X^2))  
Inverse cosine = 1.570796 - (ATN(X/  
SQRT(1 - X^2)))

Note that the formulae given in the  
Dragon manual for these functions are  
incorrect. Following are some further  
formulae relating to triangles, which may be  
found useful. They relate to any triangle,  
the capital letters A, B and C referring to  
the three angles, and the lower case letters  
a, b and c the three sides. In each case  
each side is the one opposite the

sides will be at a maximum. By sliding the  
upper disc sideways, the area of the table  
covered will slowly increase, while area of  
overlap will decrease. Eventually, the two  
discs will be side by side giving maximum  
coverage on the table but with no overlap.

At some point during this operation, the  
area of overlap will be exactly equal to the  
non-overlapping parts of the discs. How far  
apart are the centres when this occurs? (In solving this problem the re-  
cords should be regarded as solid discs —  
no allowance need be made for the two  
holes in the centres.)

## Prize

CABLE SOFTWARE is offering to  
reward a chance to win six six lateral  
games for the Dragon. The games,  
distributed by PSL Marketing, usually  
retail for £6.95 each. They are:

**Superbowl** — a simulation of American  
Pro-Football starring Royce of the  
Dallas Cowboys. **Guerrillas** — a  
Hutchback type game with 10 screens  
and four levels of difficulty. **Zak McKracken** —  
featuring an ace helicopter pilot leading  
a dangerous mission into Vietnam.  
**Home Base** — a fight against laser  
bats and energy bolts. **Eager Edna** —

avoid the Troglodytes as you work your  
way around the maze searching for  
keys to enter the central chamber.

**Fighting Fantasy** — an arcade adventure  
with 35 different weapons and full  
colour animation.

## Rules

TO WIN the software you must show  
both the answer to the competition and  
how to solve it. Please do not send in a  
cassette containing the answer. As a  
tip-breaker complete the following  
sentences in 15 words or less: "I want  
Cable Software's six lateral games for  
my Dragon because ..."

Your entry must arrive at Dragon  
User by the last working day of January.  
The winner and the solution to the  
competition will be published in our  
April issue. Entries will not be acknow-  
ledged and we cannot enter into corres-  
pondence on the result.

## October winner

THE WINNER of the October competi-  
tion and recipient of £200 worth of  
software from Salamander is D C  
Pauliner of Macclesfield in Mid-  
Cheshire, who had a score of 40,  
beating the joint runners-up by one.

# St. George now has two choices!

## Red or green will slay the Dragon

- ▲ Nylon encased-Steel shafted joystick with ball and socket joint.
- ▲ Fast sprung return to centre.
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# Voltmace *delta 3d*

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**DRAGON 32**  
**TANDY COLOUR 32 K**

# TIME BANDIT

Tired of games that have only a few screens or force you to follow strict levels?

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